On the use of simulated lidar data to test and optimize [†]ozone and temperature lidar algorithms.

Thierry Leblanc and I. Stuart McDermid

Table Mountain Facility
Jet Propulsion Laboratory
California Institute of Technology
Wrightwood, CA 92397-0367

Abstract

When dealing with atmospheric measurements, especially within the framework of an international network such as the Network for the Detection of Stratospheric Change (NDSC), a commonly underestimated source of uncertainty in the archived product is that due to the data analysis and processing. Using results from simulated lidar data this presentation reviews a number of potential errors in ozone and temperature lidar analysis/processing. Assuming known atmospheric temperature-pressure-density and ozone profiles, theoretical lidar signals were calculated based on the true specifications and characteristics of a number of actual lidar instruments. The simulations were initially performed for temperature and ozone climatological profiles, and for various profiles derived from these climatologies including realistic atmospheric and instrumental perturbations. Comparisons between the original and retrieved temperature and ozone profiles allow various errors caused by non-optimized analysis algorithms to be quantified. By varying parameters in the simulations it is possible to determine both the source and the magnitude of these errors.

[†] The work described in this abstract was carried out at the Jet Propulsion Laboratory, California Institute of Technology, under an agreement with the National Aeronautics and Space Administration.